A Working Plan For Itasca Park

By

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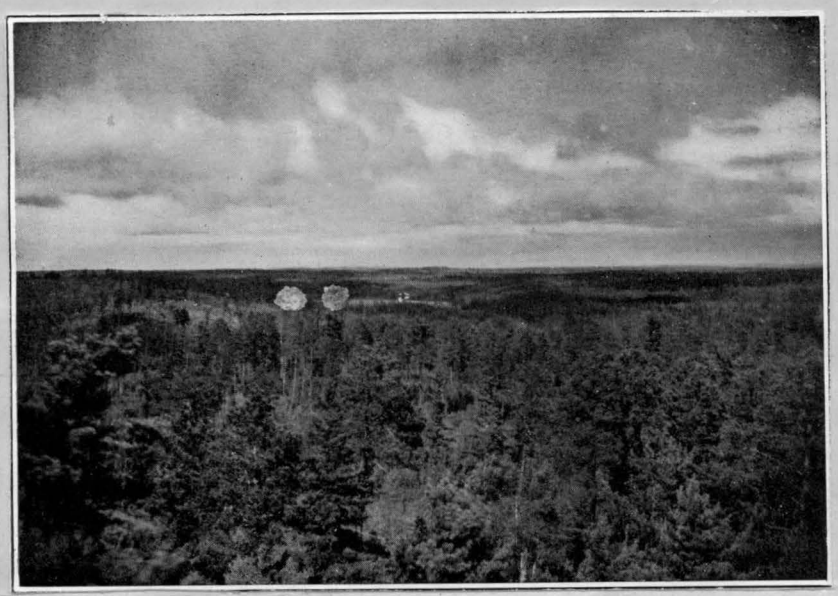


Birds-eye View of Lake Basin.

A Working Plan for Itasca Park.

The great pine belt of the Lake states, starting in Michigan, where it occupies the northern part of the Southern and all of the Northern Peninsulas, and extending westward through northern Wisconsin and Northern Minnesota, finds its western boundary in Norman County, Minnesota. The general topography of the region as a whole is that of a great plain thickly dotted with lakes and swamps and subdivided by numberless small streams, all of them more or less drivable by the aid of splash dams.

The whole area lies within the region visited by the glaciers and the physiography of the country is directly due to their work. The soil is every where composed of a heavy layer of glacial drift varying from pure quartz sand to a coarse gravelly clay according to the origin of the drift and the intensity of the glacial action. In the extreme north-eastern corner of Minnesota where the granitic rocks resisted the ice sheets and in the western portion of the state on the edge of the great glaciers was ploughed up into an irregular system of quite extensive hills very different from any other portion of the pine belt.

In these western hills the Mississippi river has its source in Itasca Lake and the surrounding marshes. The Legislature of Minnesota in 1891 set aside the land around Lake Itasca, composing the watershed at the head waters of the Mississippi, as a state park. The tract is seven miles from North to South and four and three quarter from East to West. The eastern row of sections lies in Hubbard county, the southern tier in Becker county, and the remaining portion, the great bulk of the Park, in Clearwater county. It includes all of Lake Itasca and the reservoir bowl draining into it.

The Infant Mississippi.

Mississippi at the North End of the Lake.

To aid in the establishment of the Park the United States government agreed to give what land it owned within the boundaries, on condition that the state would purchase all the rest. The state has not as yet carried out all of its part of the contract. Through the right of eminent domain it has obtained options on all of the land in the Park and has bought a portion of the land outright together with the standing timber. A small annual appropriation has made possible the buying up of portions of the land from year to year, but a great deal of the standing timber belongs to lumbermen. It is thought best to allow the cutting of this timber under proper restrictions rather than attempt to buy it up at fancy prices. The acquisition of standing timber is no advantage to the state since it already owns sufficient to fulfill the purpose of the Park.

This purpose was to establish a game preserve and save from destruction a small patch of the primeval forest, where future generations might see the original denizens of the forest in their native habitat as their forefathers saw them. The source of the Father of Waters, a spot of historic and sentimental interst, is admirably suited to such a purpose.

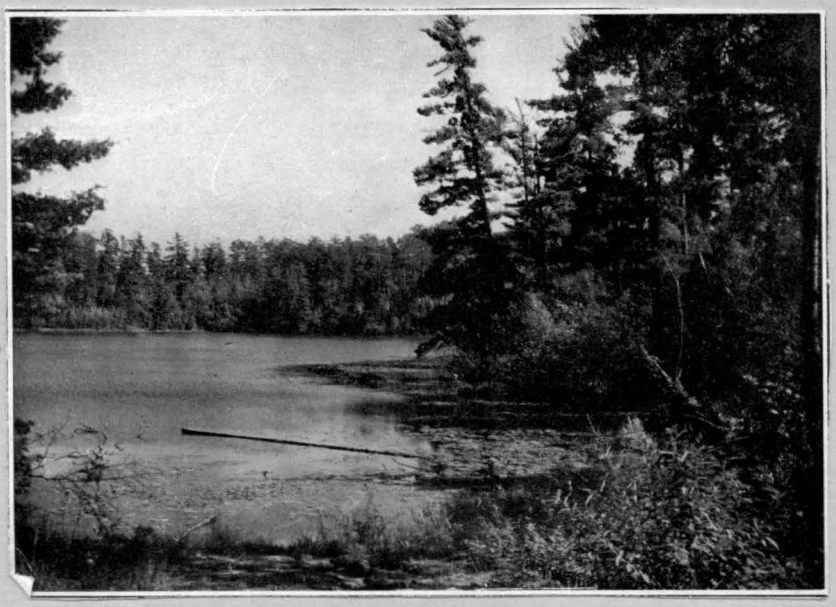
At the time of its formation the control of the Park, like that of all other state Parks and game preserves, was placed in the hands of the Governor, who appointed a Park Commissioner to have immediate management on the grounds.

To make the Park more accessible to the general public and to encourage its use as a summer resort a large frame house was built on the South-east corner of section 2 on the shore of the Lake as a home for the Park Commissioner and a hotel for summerguests. In 1902 a new house was built, a handsome, twenty room log lodge costing $17,000, at the South end of the East Arm of the Lake. This

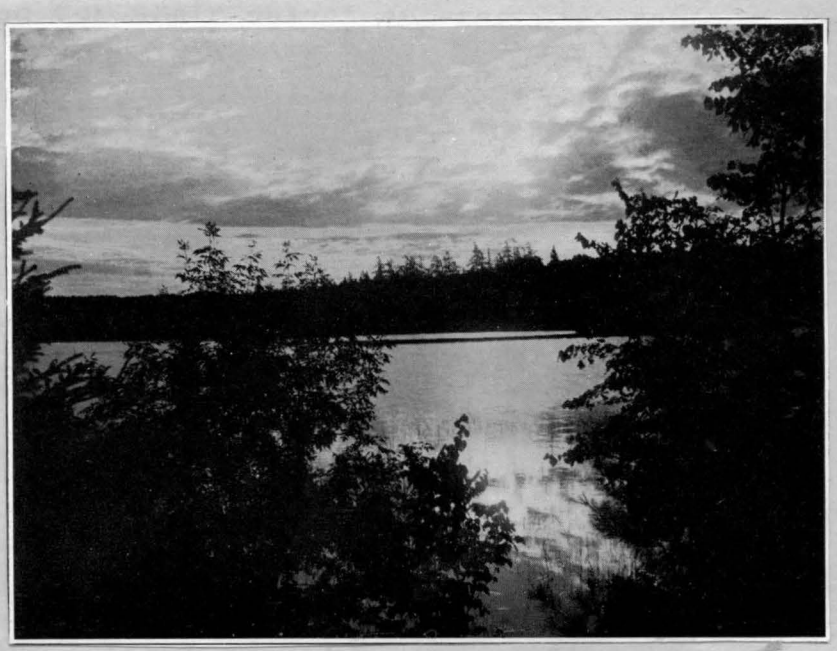
is well patronized and cannot begin to accommodate the visitors. The old lodge was abandoned.

The post office of Itasca Lake is situated on the lake shore just beyond the boundary of the Park north of section 2,four miles from the new lodge. However,the nearest point on the railroad is Park Rapids twenty-six miles to the south of the Lodge. The main stage road,over which there is a daily stage to and from Park Rapids,skirts the shore of the Lake from the post office to the new lodge,turns east one mile and then winds soutward along the east boundary,sometimes inside the Park and sometimes outside to the south east corner. Another road leaves the main road at the south east corner of section 18,skirts the edge of the Park for two miles and then cuts north we st across the corner of the Park to Itasca Lake post office. Branches from this road lead to Mallard and Bemidji. As these are the only travelled roads in or near the Park that portion east of the Lake is,of course,most exposed to the view of the passers by and most frequented by visitors in the summer.

During the past few years the Park has been very much neglected. The boundary is wholly unmarked and unprotected;the roads are in miserable condition;the woods (with the exception of the immediate vicinity of the Lodge) is overrun with underbrush and practically impenetrable to summer visitors. The beauty of the woods is spoiled by the presence of a large quantity of dead and down timber,and many blanks,caused by fire,are grown up to an unsightly tangle of underbrush and worthless hardwoods.



Timber on the Shore of Deming Lake.



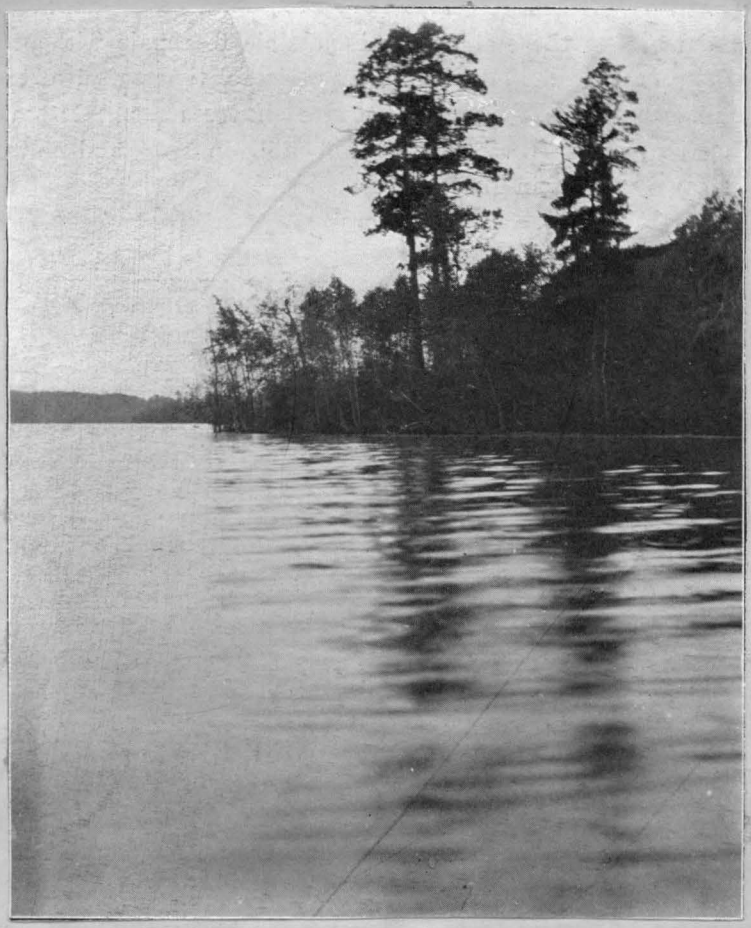
Vista opening onto Mary Lake.

Purpose of Investigations.

It has been proposed to transfer this Park from the control of the Governor, where it is neglected through lack of interest and lack of appropriations, to the control of the State Forestry Board where it will receive proper attention and where it naturally belongs. In view of the proposed plan the Forestry Board desired a working plan for the Park that they might beginwork immediately. Since the initial appropriation would be too small to work on a very extensive scale, the working plan was confined to that portion of the Park east of the Lake, which, from its exposed position, will require different treatment from the rest of the tract.

The investigations, the result ofwhich are set down in the following report, had for their object an exact and detailed description of the tract studied including the stand, conditionand location of all mture timber and a study of the measures and methods necessary to make it better suited to serve the purposes of a State Park. Though the laws governing the management of State Parks prohibit the cutting of green timber, a rather careful estimate of all the standing timber was made in order to obtain some idea of the value of the state holdings at present and in the hope of later obtaining a modification of the law.

The conclusions reached were: That the beauty and hence the usefulness of the Park as such, could be greatly increased by the planting up of blanks and the underplanting of thin stands; the cleaning up of dead and down timber and the clearing out of brush especially between the main travelled road and the Lakeshore. And it was further decided that these improvements can be readily m



Showing the effect of forest growth on the immediate lakeshore.

made at a small initial expense, with the probability of a net revenue at the end of forty years.

Description of the Tract Studied.

The tract studied consists of sections 6,7,18,19, and 30 T142 N. R. 35 W. in Hubbard county and those parts of sections 1,2,11,12 and 13 T 143 N R. 36 W. in Clearwater county, which situated east of the Lake. All this land is made up with the exception of the swamps along the Floating Bog and Mary Creeks, of ranges of irregular hills from fifty to one hundred feet high dropping away to the westwardinto Itasca Lake, Mary Lake, Mary Valley and Deming Lake.

There are three types of land which can be distinguished everywhere on the tract: Jack pine land, White and Norway pine land and Swamp. These three types, based on the timber as it stands at present, can now be everywhere clearly distinguished, but the presence of occasional white and Norway trees in the Jack pine type makes it assured that this type can everywhere be changed by careful managemnet to a white and Norway pine forest. There is a small per cent of popple thicket and waste land which is also well suited to the growth of white and Norway pine.

The Jack Pine Type.

The Jack pine occupies about 603 acres, 16% of the tract, and is located in a fairly compact area in the hills in the eastern halves of sections 7,18 and 19. The soil, though more sandy than that found on the rest of the tract, differs from the typical Jack pine land in that it contains a slight trace of clay. The subsoil here, as in all the rest of the tract, is a very gravelly

Norway in Birch.

A Veteran White Pine.

(Jack Pine?) coming in in scrub Hardwoods.

Spruce?

clay. Humus there is none. The ground cover, where there is any, consists of a thin crop of grass. The underbrush is made up of a dense stand of alder, scrub popple and paper birch. The Jack pine itself is mostly small, 10 to 15 feet high, and pretty well scattered, only standing in dense stands on comparatively small patches. Occasional small Norways and white pines show clearly the possibilities of the soil. The commercial value of the type is practically nil though the Jack pine can be made use of in the scheme of management and eventually used as box board or lath stock. At present it forms a rather open cover which partially protects the soil and hides the barrenness of the ground to a considerable extent.

The White and Norway Pine Type.

The White and Norwaypine type occupies about 64% of the tract, or 2609 acres. Unlike the Jack pine it occurs mostly in bunches pretty well scattered over the entire area. Only along the lakeshore and in the two sections to the southward are pure stands of any considerable extent found. Here the stand will run from 4,000 to 60,000 feet B.M. to the acre, the densest stand being on the lakeshore of section 13. The per cent of white pine in the mixture varies from 70% in the northern sections to 25% in the two lower sections. The trees of both species are tall, straight, clear boled and small crowned, but will not average over 18 inches D.B.H. though the white pine in some stands will average as high as 24 inches D.B.H. The white pine has a much more rapid taper and tends to be more limby than the red pine except where the stand is very dense. The land is littered with a quantity of down timber. The soil is much the same as that of the Jack pine

On the Lakeshore Slope.

Showing the Norway Stand On the East Shore of the East Arm of Lake Itasca.

type but contains a litle more clay and consequently a little higher moisture per cent . There is about an inch of humus and the ground cover is made up of a number of small plants - snow prevented an accurate examination. The underbrush ,as in the Jack pine consists of alder,popple and birch ,thicker where the Norway predominates,much thinner where the white pine forms the bulk of the stand. Reproduction is somewhat scattering but seedlings one inch high(larger growth has been kept down by fire) are doing nicely in such places where the underbrush does not crowd them out. On account of red heart and fire the cull will probably run as high as twenty per cent.

Swamp.

Five hundred and forty-eight acres,13% of the tract is swamp-mostly tamarack swamp. ,Like all the other tamarack swamps of the lake region they are occupied by a dense growth of tamarack and black spruce with a little balsam and white cedar mixed in. They usually occur in more or less isolated patches along the streams or in the pot holes between the hills and are bordered by thickets of popple and birch. There is more or less water in the swamps the year around,some of them containing more than other s-for they are all old lake beds in various stages of drying up. A dense undergrowth is formed by the cedar and the reproduction of the dominant species. The tamarack is of good size for posts,poles and an occasional one for ties;the spruce, are of small size and located so far from the railroad,is practicallyy worthless. The other species are wose than worthless. Many of the swamps will be hard to log on account of their location in the midst of the hills with steep slopes all around them.

Cedar Swamp.

Tamarack Swamp.

Detailed Description of Tract.

Section 6 is a small section of 480 acres. And the north boundary of the north west quarter there is a small swamp of about 10 acres another of 45 acres occupies the southern part of the north west. and the southern part of the south west quarter, while still another, the La Salles swamp, of about ninety acres, extends down through the centre of the East half from the north boundary southward to the south line in a narrow strip varying from eighty rods in width in the north to forty rods in the south east quarter. A narrow ridge from north to south separates the two large swamps in the nath half terminating at the north east corner of the south west quarter in a high peak. Another ridge occupies the south half of the south west quarter and a string of irregular hills east of La Salles Swamp borders the section on the East. The swamps here have never been logged, They are of the same description as those descibed under the type . The two eastern forties of the north east quarter are cut over and the second growth is largely scrubby jack pine. The high land to the west of La Salles swamp bears a fairly heavy stand of white and Norway pine, the white pine forming twenty-eight per ceny of the stand. There are two age classes present. Scattering trees of mature size here and there among a more dense stand of about eighty years growth, trees averaging between 10 and fourteen inches D.B.H. Along the eastern boundary the jack pine which occupies practically all of the land east of the Park, intrudes here and there upon the timber type. There is upon the whole section about 1,000,000 feet B.M.; 300,000 feet white pine and 700,000 Norway.

Section 7 is another small section of 480 acres. Down the east line is a fairly high, welldefined ridge. A narrow valley on the west of this ridge is bordered [illegible]

Burnt over Land.

Young Stand on Unburned Land.

country extending all the way to the west line of the section. In the southwest quarter are four small tamarack swamps aggregating thirty six acres. The only good timber on the section is a heavy stand of mature white and Norway pine on both slopes of the narrow valley running north and south down the centreof the north half. Here the stand is very dense and about 12% white pine. The east slope of the east ridge is mostly jack pine with a very scattering growth of small white pine and Norway. The high ground in the North west quarter carries about the same stand of small white and Norway as the land to the north of it in section 6. The thin stand on the high ground around the swamps in the southwest quarter has been badly damaged by fire and thinned out to 1,500 feet B.M. per acre of poor grade timber. The whole section cruised:1,080,000;130,000 white pine ;950,000 Norway.

Sections 19 and 30. These two sections have so many points in common that they may be grouped together for description. Owing to the addition of a narrow strip of land to the eastern boundarybof the Park in 1903 they are both full sections. Both are characterized by a broad high ridge down the centre from north to south. This ridge is bounded on the west by an abrupt slope ending in a string of swamps and lakes which occupy nearly all the west halves of both sections;Mary Lake,situated thirty nine feet above the level of Lake Itasca,with which it is connected by Mary Creek in the south west quarter of section 19,and Deming Lake in the south west quarter of thirty connected by Mary Valley Swamp. To the east the ground rises again into a ridge broken at short intervals by small lakes and swamps. The central ridge with the exception of a section about eighty rods long opposite the north end of Mary's Lake is well covered with a dense stand o

of jack pine, is timbered throughout with a dense stand of white and Norway pine, the white pine forming 35% of the stand. The ea east half of the northwest quarter and the southwest of the north east quarter of 19 are covered with a dense stand of jack pine. The Mary Valley Swamp occupies 112 acres of section 30 and the small swamps in 19 aggregate 52 acres. The high ground in the east halves of both sections bear a broken stand of small white and Norway in the large pole stage.

Cruising: Section 19; 800,000; 70,000 white ; 730,000 Norway.

Section 30: 1,200,000; 300,000; 900,000 Norway.

Section 13. That portion of thirteen located east of the lake consists onf 181 acres, nine of them swamp. With the exception of this nine acres of swamp the whole area is of white and Norway type: 63% Norway 37% white pine. A ridge along the east boundary is broken a hundred rods north by a small bog about thirty rods wide; and rises again to the north. West of the ridge a comparatively level bench extends to within twenty or thirty rods of the Lake shore and then drops in a steep slope to the water's edge. The west slope of the ridge and the bench are fairly well timbered, eight to ten thousand board feet to the acre, but the bulk of the timber is on the slope running down to the Lake where the stand will run from fifteen to twenty thousand and more on the north end. There is the ruin of an old portable saw mill on the west end of the bog, from which all the timber has been cut , and all the timber to the north is badly burned and worthless.

The north east quarter of section 13 has much the same topography as the southeast quarter and the timber is distributed in much the same way, but the strip along the lake shore is wider and

the stand of merchantable timber much heavier. There is a little more timber on the ridge and a great deal of dead and down stuff.

Estimate:1,800,000;680,000white;1,120,000 Norway.

Section 18 is another small section of 480 acres. Nearly all the area is in jack pine. The whole section is taken up with an irregular mass of fairly high hills,irregular ridges and small sharp peaks,separated by shallow valleys. The higher hills are near the east boundary. On the east slope of the ridge in south east and north east corners of the section there is a fairly good stand of Norway,with twenty per cent mixture of white,and in the north west of the southeast quarter there is a bunch of about 75,000 feet B.M. of Norway covering about five acres. With the exception of a few acres of timber pine running down from section 7 all the rest of the section is jack pine. The ridge and the high points are practically bare save for a scattering growth of alder pople and birch. The slope and the narrow valleys are covered with a growth of small jack pines,in places dense, but mostly scattered among the underbrush. Here and there a small Norway pole rises above its surroundings or a white pine makes its way up through the birches showing the possibilities of the soil. Aside from these lonely strangers there is nothing merchantable on the section.

Estimate: 650,000;130,000 white;520,000 Norway.

Section 12. The southeast quarter of section 12 is fairly well timbered. Like the portion of section 13 to the south of it, most of the timber is located on the slope running down to the Lake shore. The Norway predominates in the number of individuals but the white pine are larger and the volume is pretty evenly distributed between the two species. The ridge on the east half is fairly well timbered but the stand is over [illegible]

damaged
ly by fire. Except on the lake shore slope, which has been well cleaned of all undergrowth, there is a heavy undergrowth of popple, birch and alder.

The north east quarter is much the same as the east half of the southeast quarter., a scattered stand of Norway and white pine running from 3,000 to 4,000 feet B.M. to the acre. of badly fire scarred and defective timber, with a rather thich undergrowth of small worthless hardwoods. The narrow strip in the north sloping down to the flat along the Floating Bog Creek, carries a little denser stand, but the Norway and white are small, seldom over twelve inches D.B.H., and Jack pine enters largely into the mixture.

The north west quarter contains very little valuable timber of any kind. The stamd on the high grond is even lighter than that on the same type of ground to the east. The strip along the lake shore is of lighter stand and a smaller class of timber than that to the south. The strip along Floating Bog Creek is the same as that of the northeast quarter and the extreme north west corner is the tamarack swamp itself.

Estimate: 2,500,000; 290,000 white; 1,210,000 Norway.

Section 11. The point running down into the northe ast quarter of section 11 is composed of a small plateau of about twenty acres thinly covered with Norway pine and surrounded by a strip of tamarack swamp i In the swamp, and more especially around the edges of it , is a scattering of black spruce and balsam. The underbrush here has been pretty well cleaned up. The timber is rather small and of poorer quality than the rest of the lakeshore strip.

Estimate: 20,000; 8,000; 12,000. Norway.

Section 2. On that portion of section 2 lying east of the Lake there is very little merchantable timber. On the high ground in the northern half of the south east quarter there is a scattering growth of Norway not exceeding 40,000 feet altogether. In the southern end of that quarter on the shore of the lake is the old lodge, with its barns and out houses. To the east of the lodge is a cleared field six or eight acres in extent and the level point running southward to Floating Bog Creek is covered with a rather dense thicket of popple five or six years old. There is a good layer of humus on this popple land and the soil, which contains plenty of moisture, is a sandy loam with a clay subsoil. A fine location for a nursery. All the land north of the south east forty, clear through to thenorth line of the Park, is waste land, a wilderness of birch, popple and alder with an occasional small pine, white, Norway or Jack. This condition seems to be the result of fire. The contour of the land is rather regular, a flat strip from twenty to thirty rods wide along the lake shore running into a slope which continues to the ridge along the east boundary.

Estimate: 50,000feet:8,000 white pine; 42,000 feet Nowway.

Section 1. presents a much more varied topography. A strip of swamp about sixty rods wide on both sides of Floating Bog Creek extends clear across the south end of the section. In the centre of the north half running north and south is a high plateau from which the land slopes south, east and west. From two small swamps on the west it rises again to the ridge on the west boundary. To the south it falls to a terrace which slopes into Floating Bog Creek. To the east the country is rolling, the prominent features being two small plateaux in the north and an isolated

hill near the north line of the south east quarter. The swamp contains a good stand of tamarack with a slight mixture of black spruce,Balsam and Cedar. The west half of the north west quarter is waste land,popple,birch and alder,such as that in section 2. On the other high land in the section there is little very large timber,but there is a very good stand of young merchantable timber,10 inches to 12 inches D.B.H.,70% white pine.

Estimate: 1,300,000 feet:900,000 white;400,000 Norway.

Improvements.

Fire Protection.

In its present condition the entire park is wholly exposed to the danger of fires started outside the boundaries. Even in the uninhabited,primeval forest the situation would be sufficiently precarious,as the fire scars in all parts of the woods bear witness,but with lumber companies operating within a mile or two of the Park on either side and settlers living all around the edges, this danger is ever present and ever increasing. One big fire would totally destroy the value of the tract for park purposes and would cost the state many thousand dollars and many years of labor to restore forest conditions.

Fire protection should,then,be the first thing considered. To protect the portion of the park under consideration,it would be necessary to put in a fire lane along the north boundaries of that portion of section 2 east of the lake,1 and 6;down the east boundaries of sections 6,7,18,19 and 30,and along the south boundary of section 30 to Deming Lake. To accomplish this it would be best to clear all the brush and small trees from a strip three rods wideand burning it over so as to leave the ground absolutely clean. A bridle path along the inner edge of this strip, expo

exposing the mineral soil, would greatly increase i ts effectiveness. The plowing of a couple of furrows along the edges of the strip, where the roots would permit it, would facilitate the burning of the brush and add to its value as a fire break. This would mean the clearing up of the brush, and burning it, on fifty acres. The cost would vary from $5.00 to $10.00 per acre according to the density of the brush. The tract is too far from the market for the sale of the jack pine wood to produce a positive revenue, but it can in every case be disposed of at a price to pay for its removal. If the making of a fire break around the whole park were considered it would pay to install a small lath mill for the manufacture of the jack pine and popple on the spot. Such a mill would be useful in the future management of the reserve. Dry Jack pine cordwood brings only $2.00 per cord in Park Rapids, twenty-six miles away; while lath sells for $3.00 per thousand.

Such a fire lane would protect the east portion of the Park from anything except a big crown fire and would furnish a good base from which to start back fires to fight that. The clearing of the brush from strips along the roads running across the south end of 19 and across the north east corner of the park would effectively subdivide the tract into compartments to protect them from each other. The four miles of the latter would not cost over $3.00 per mile. Four hundred dollars would more than cover the cost of all the firebreaks.

Trespass.

This cleared fire lane would serve the double purpose of protecting the Park from fire and from trespass. At present the boundary is nowhere distinctly marked except where the roads and trails cross it. A man wandering around in the woods can notpossibly tell when he crosses the line into the Park. While there are

Norway on Lake shore Slope.

Mary Lake through the Tree Tops

many cases of intentional trespass and poaching on the part of the neighboring settlers there are many others who wander into the park unwittingly. The settlers use ignorance of the line as an excuse for their trespass, the strangers are really innocent. Both these conditions are sources of dissatisfaction. It causes the settlers to growl at the management of the park and look upon the whole thing as a nuisance. They are justified in this feeling. Something should be done to make it a real park or it should be abandoned and the people of the neighborhood freed from the irksome restrictions. The establishment of a firelane around the boundary and the posting of warning notices every forty rods would make innocent trespass impossible and would greatly reduce the amount of intentional poaching. Many a man who would cross an imaginary line would not dare to pass by a prohibitive sign - board. It would further give the settlers a feeling of pride in the park which would be a great help in its care and management.

The Road.

The second improvement, which would be most beneficial to the park, both by gaining the goodwill of the neighboring settlers and increasing its accessibility, is the repairing of that portion of the stage road within the park. The stage road from Park Rapids to Mantrap, the portion in the control of the town, is in fairly good condition; within the boundaries of the park the road is in shameful shape and is almost impossible in the spring and summer. Automobiles are prohibited by the poor roads and an otherwise pleasant drive is ruined by this five mile string of mudholes at the park end of it. A few inexpensive repairs on the road would do more than anything else to please the settlers and would greatly increase the number of visitors to the park.

Planting.

In order that the Park may fulfill its purpose- the preservation of a pine forest forever- in the best manner and at the same time produce timber to its full capacity, a great deal of planting must be done. The jack pine land where the stand is thin, which includes all of that type with the exception of 28 acres in section 19 and 18 acres in section 30, and all the waste land should be planted up to white pine and Norway, as well as one hundred and twenty acres of blanks in the high timber stand. 607 acres of jack pine, 273 acres of waste land and 120 acres of blanks, an aggregate of 1,000 acres to be planted. Owing to the underbrush on the waste land and the scattered jack pine on the jackpine type the seedlings need not be planted closer than 6 x 6 feet. The preference should always be given to white pine because the underbrush does not grow so densely under that species.

Planting 6 x 6 feet would require 1,210,000 seedlings for the thousand acres. Owing to the scarcity of efficient labor it would probably be impossible to plant more than 400,000 seedlings a year . In as much as there is a great deal of planting to be done in other parts of the park and it is intended to make the nursery here on the Itasca reserve supply seedlings for planting in the other state reserves, as well as for any farmers in any part of the state who may desire seedlings for forest planting, it is thought best to make this nursery lagge enough to supply 1,200,000 two year old seedlings annually.

Allowing one square foot of seed bed to every eighty seedlings 15,000 square feet of seed bed would be needed the first year and as much more the second. Both these plots should be prepared the first year that the second year plot may have a chance to mellow.

Birch Thickets. Ideal places for planting White Pine.

The second year a third plot o the same size should be preparedthat the firstoplot may have a years rest in preparati on for replanting. Thus it would require 45,000 square feet of seed bed for an annual output of 1,200,000 two year old seedlings. Making four foot beds with one and a half foot paths between this would require an area 200 by 309 feet, or about one acre and a half. Judging from work of a similar nature carried out by the state on the Pillsbury State reserve the production of these seedlings would cost about fifty cents per thousand. The popple thicket in the south end of section 2 is an ideal place for a nursery.

The remainder of the ground now occupied by the popple thicket could be made to greatly increase the attractiveness of the Park as an arboretum. By carefully choosing the locations for specimens it would be possible to carry along a great variety of trees. Such an arboretum should be made to include all species of plants which would stand any show of growing in this climate.

Both nursery and arboretum would have to be surrounded by a fence which would be perfectly proof against deer and rabbits, for the whole park is alive with them. The deer are dangerous only in so far as the nursery and arboretum are concerned. They will not do any great amount of damage to the seedlings planted out in the forest. The rabbits, on the other hand, are plentiful enough to make any woods planting absolutely useless. They do not seem to injure the seedlings which come up naturally in the forest but eat every seedling that is planted out- especially if they are planted in rows. They must be wiped out, or at least appreciably decreased in the two years in which the seedlings are growing to planting size. Poisoning would be the only thoroughly efficient method, but this can not be resorted to an account of the danger to the settlers

who use them for food,and to the other game in the reserve. Shooting and trapping the year round should do much to decrease their number. This shooting must be confined to the officials of the Park on account of the loophole that it would open to outsiders to shoot other game.

Improvement Cuttings.

As the aesthetic feature is all important in the management of the Park,the exposed position of this tract east of the lake makes the most economic methodsof commercial logging out of the question. The most important object is to keep the stand as dense and in as good condition as possible,and the forest floor free from underbrush that the woods may be as accessible as possible to the summer visitors.

One of the most attractive features of the park is the beautiful view of the lake as it appears fromthe road on the hill through and under the the crowns of the dense stand of old Norway. For that reason the strip of old Norway along the lakeshore from the new lodge to the centre of section 12 should be as little interfered with as possible. Wherever cuttings are made necessary by the dying out of the old trees,thinnings should be made in straight,clearcut strips from the road to the edge of the water. These strips should be immediately planted up to two year old se seedlings of Norway pine. In this way the cleared strip would open up a pleasant vista which would add to the beauty ofthe view from the road while the seedlings are small. Whenthe young trees become old enough to interfere with the view it will not be many years before a little pruning will again open up the view under the crowns. This method will interfere with the view less than the planting up of scattered openings here and there, made by the removal of one or two trees. The introduction of a few hemlock

Notice the effect of the mixture of all age-classes and the consequent openings: These features must be pre-

served in these Lakeshore forests.

trees on the prominent points along this strip would add greatly to its attractiveness.

For the timber on the ridge and the slope above the road the selection system of cutting is the only treatment that is or ever will be admissable. Single trees could be removed in the winter time in such a way that they would not be missed in the summer. The openings thus made should be planted up to white pine two year old seedlings unless the presence of good seedtrees and a seed year make the natural reproduction of this species certain. White pine should be favored in every case because the underbrush is less dense under this species than under the more open Norway stands and the freedom of the forest floor from high undergrowth of all kinds is desirable. Any other method of cutting would inevitably spoil the view fro m the road.

On the areas back from the lake and out of sight of the roads the selection systemof thinning should be practiced for the next forty years. By that time the trees planted in the waste areas and the jack pine lands should have formed a dense stand tall enough to make a pleasant forest cover for the idler. The rides and drives can then be relocated in the new timber and the matur e stands cut clear. The cleared area should be immediately planted up to white pine,two year olds. The clear cutting system,when the newly cutover area can be kept out of sight,is preferable to the selection system,aside from the economic preference,because a more dense stand more free from underbrush is obtained,and the idea of actually growing trees,forests in the act of formation,is made more impressive. This point is important because it is the object of the management to make the park an illustrationof the actual workings of forestry,as well as a recreation ground for the public.This method would apply to the great bulk of the park.

The dead and down timber should in every case be removed where it is not too rotten to be useful for firewood. Where it has rotted beyond the use ful stage it will so soon be entirely decomposed that it is not worth while to remove it. Some of the down timber is still in condition to make good saw logs and can be sold on the nearest landing for ten or eleven dollars per thousand. at a good profit. By using its own teams the park could sell much of the cordwood in Park Rapids at a small profit,but most of it would have to be sold at cost or even at a small loss. Local demand there is none. Thereis,however,a branch railroad in process of construction from Akely toward the east boundary of the park and a better market may thus be opened up in the near future.

The Swamps.

The swamps are not and never will be places that are very much frequented by the pleasure seeker. They are useful only as feeding ground and a retreat fot the deer,moose and other wild game which must-since on of the primary objects of the park is the preservation of the game- be provided for in the scheme of management.In this capacity the larger trees do not play an important part;it is the underbrush which affords both food and hiding place. The removal of all the trees four inches and over D.B.H. would leave quite enough growth still standing- for the largest per cent of these swamp trees are in the lower size classes,one to three inches,and there is a great deal of scrub cedar and balsam. A four inch tree is large enough foer one post,the larger sizes will serve as poles and a few reach a size large enough for rail road ties.

Cedar on Swamp Type.

A carefuo estimation of three acres of tamarack swamp gave an average of 122 trees four inches and over D.B.H..The average was between eight inches and ten inches D.B.H. Not over ten trees to the acre were large enough for ties and few of these would make more than one standard tie and two posts. Fifty-five to the acre would make good poles;the remaining sixty-seven would average two posts to the tree. The growth of these swamp species is so slow that a second crop cannot be definitely counted on. For this reason it is thought the best business policy,since it does not in any way interfere with the park features,to take every thing merchantable on the first cutting. It is recommended that some European larch be planted in and around the edges of these swamps as an experiment to.see whether it is hardy in that country and if its growth will not be much more rapid than that of the native species.

Brief Summary of Recommendations.

Always keeping in mind the chief object for which the Park was founded, the establishment of a pine forest recreation ground for the people and a game preserve, the following recommendations are made for its improvement and management:

1. The clearing of a fire lane three rods wide around the boundaries of the whole park with a like strip along the south line of section 30 to segregate that portion east of the lake, and the posting of trespass notices all along the boundary at intervals of 40 rods.

2. The improvement of the maintravelled road from the south east corner of the park to Itasca Lake post office and the location of new roads and saddle trails through the best forested portion of the tract and touching the principal points of interest such as La Salles Springs and the beaver dams.

3. The establishment of a nursery on the south east quarter of the southeast quarter of section 2 in the vicinity of the old lodge, capable of an annual output of 1,200,000 two year old seedlings.

4. The maintainance of the Norway stand on te lake shore slope between the road and the lake as nearly as possible in its present condition. Dead trees to be removed by clear cut strips so placed as t o open up pleasing vistas from the road to the lake. These strips to be seeded up from the bordering trees or planted with two year old seedlings of Norway pine. As soon as these trees become large enough to interfere with the view from the road they should be pruned up so as to give a view under the crowns.

5. The working of the mature timber on the slope above the road by the selection system forever, always favoring the white

pine,so that the forest cover need never be broken and the beauty of the primeval forest maintained.

6. The planting of all waste lands and all thin jack pine stands to white pine,spaced not less than 6 x 6 feet.

7. The treating of all the mature timber back from the lake and out of sight of the roads bythe selection system for the next fofty years,during which time the planting in the blanks may have grown up to a size to form a high forest cover. The trails to be located in the new timber at the end of this time and the old timber to be cut clean. The cutover land to be planted up immediately to white pine two year old seelings spaced 4 x 4 feet.

8. The treatment of the mature stands in sections 19 and 30 by the group system,always favoring white pine,relocating the roads and trails whenever necessary that they may never pass through any unsightly stump land.

9. The cleaning up of all dead and down timber to be disposed of as saw logs or cordwood when possible;to be burned when not merchantable.

10. All tamarack four inches and over D.B.H. to be logged from the swamps.

11. A campaign against all the rabbits on the tract;the shooting and trapping to be confined strictly to officers connected with the management of the Park that there may be no poaching of other game under the pretext of shooting babbits.

12. The placing of sign boards,preferably green,at all cross roads and all points of interest on the roads and trails.

13. That a demonstration school of forestry for the Forest School of the University of Minnesota be established in the Park

in t e old lodge that the advantages of the Park may be utilized to its full extent. The services of the students to be used in the economic handling of the reserve and the instructors to have charge of the management.

14. The remainder of the popple thicket mentioned above, not used for a nursery, to be utilized as an arboretum.

Estimated Revenue for the Next

Twenty Years.

Area under selection system 1681 acres. The hypermature character of the timber will necessitate, on an average, the removal of one tree, 300 feet, per acre per annum 504,300

Area under group system 788 acres, 2,009,000 feet one half of it to be cut in 40 years.

Annual cut from original stand 25,110

" " " increase 19,700

Value of pine timber output

549,110 ft.B.M. at $7 per M. $3,843.77

Area of timbered swamp 392 acres

Number of ties 3,920 at 25 ¢	$980.	
" " poles 21,560 " 60 ¢	12,960.	
" " posts 60,388 " 8¢	4,831.	
	$18,771.	

To be cut in ten years, annual output $1,877.10

Annual revenue from dead and down timber according to former experience $400.00

Total annual output from all the timber on the tract in value $6,120.87